MOTION PICTURES IN THE TRAINING PROGRAMS OF THE UNITED STATES NAVY

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MOTION PICTURES IN THE TRAINING PROGRAMS OF THE UNITED STATES NAVY

A THESIS

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By

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CHAPTER I

THE PROBLEM AND ITS SCOPE

The Problem

The main purpose of this study was to determine the present status of motion pictures in educational and training programs, particularly, but not entirely, with respect to the United States Navy. This involved research in the following fields: 1. a history of the motion picture industry; 2. a resume of the Navy's administrative and production procedures with motion pictures in World War II; 3. a review of the available literature as to the influence of motion pictures in training programs; 4. a review of the latest and most thorough of all studies that are presently being conducted by Pennsylvania State College in this field; 5. an estimate of the future possibilities of motion pictures through the medium of television. As to this last area, it should be noted that complete agreement with Hoban exists concerning the differences between television and motion pictures:[1]

> Television...is capable of transmitting, with the extraordinary facility of radio, all the symbols and most of the techniques employed in motion pictures. Theoretical distinctions between motion pictures and television are, therefore, limited to considerations of technical transmission and scheduling, and audience density, structure, and viewing

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1. C. F. Hoban Jr., "Some Aspects of Learning From Films," p. 20. Incidental Report No. 2, Pennsylvania State College, Instructional Film Research Program, June 21, 1949.

habits and conditions. In the communication media (symbols) employed, television and film are theoretically identical.

Need for the Study

In his eleven years experience in the Navy the author has had the privilege of administering two large training programs that involved considerable use of motion pictures. During these periods and subsequent to them he has been asked by Naval officer contemporaries innumerable questions which indicated the average Naval officer's insufficient knowledge of the field of training with motion pictures. This study is an attempt to summarize research studies as well as possible, in referenced form, so that answers to many elementary questions are answered and so that further study may be made by reference to the cited works.

Delimitations

The problem was limited to the more theoretical aspects of training with motion pictures. For example, no attempt was made to consider the mechanical aspects, such as threading motion picture projectors, trouble-shooting with "fouled" transmission devices, or laying out the motion picture classroom. For such problems as these the reader is referred to an excellent brief text covering these and similar such problems by Dent.[1] This study is meant to provide the Naval

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1. E. C. Dent, The Audio Visual Handbook. Chicago: Society for Visual Education, Inc., 1949.

officer a quick reference on motion pictures for training programs.

Definitions

Braun tube--a cathode ray tube in which a stream of electrons, controlled in intensity by the incoming signals, is caused to sweep over a fluorescent screen by a varying magnetic field.

Cathode ray tube--a discharge tube used for projecting cathode rays. Cathode rays are projected from the cathode of the tube in which the electric discharge takes place. They consist of electrons, moving in straight lines unless deflected by the action of a magnetic or electric field, and differ from the beta rays only in having smaller velocities. By impinging on solids the cathode rays generate X rays.

Dissolves--motion picture sequences in which the old scene is absorbed by the new one by appearing on the outer edges of the screen, the old scene assuming the shape of a circle in the center the diameter of which becomes smaller and smaller until it completely disappears from its pin-point self in the center of the screen.

Dynamic--pertaining to changes, changes in process, or involving or producing alterations.

Emulsion--a suspension of sensitive silver salt, especially silver bromide, in a viscous medium, usually a gelatin solution, used for coating plates, films, etc.; also, the coating when dried.

Fade-in--the gradual appearance of the screen image from total darkness to its full visibility.

Fade-out--the gradual disappearance of the screen image from its full brilliance to total darkness.

Iconoscope--a registered trade mark applied to a class of electron-gun pick up or camera tubes employing the storage principle in their operation and utilizing an electron scanning beam to convert photoemission effects into video signals.

Image dissector--a type of television camera tube developed by Farnsworth.

Kinesthetic response--that type of response that gives sensory experience to the senses whose end organs lie in the muscles, tendons and joints of the human body.

Kinetoscope--a trade mark applied to a machine for producing motion pictures.

Montage--the movie process of producing several images that revolve around each other or that rush one after the other to a sharp focus in the foreground, as newspaper headlines. Also--the production of a rapid succession of images to illustrate an association of ideas.

Mutoscope--a simple form of animated-picture viewing device in which the series of views is printed on paper and mounted around the periphery or a wheel.

Orthicon--a registered trade mark applied to a pick up or camera tube, representing a refinement upon the

Iconoscope, in which the storage electrode is scanned by low-impact-velocity electrons.

Panchromatic film--film sensitive to all colors.

Phi-phenomenon--the apparent motion of lines, pictures, or other objects which are shown in rapid succession of different positions, without any actual motion being presented to the eye. Movies depend on this illusion.

Stereopticon--a highly developed form of the magic lantern, using chiefly photographic pictures and an intense light, and often made double so as to produce dissolving views.

Wipes--motion picture sequences in which the new scene pushes away the old one by appearing in the center of the screen, gradually becoming larger and larger until it replaces the scene before.

CHAPTER II

BRIEF HISTORY OF THE MOTION PICTURE INDUSTRY

Early History

Motion pictures are of recent origin. The first motion picture projector made its appearance in 1895 and came as a result of three previous inventions; one was photography, another the magic lantern and the third an optical toy which gave an appearance of movement to a rapid showing of several static pictures.[1] Several optical toys of the type referred to here have been in vogue at various times since their inception. One type, still rather well known, involves a number of pictures in a bound book each printed on a page of its own in a slightly different phase of some continuous action. The flexible book's bound edge is held in one hand and the book is bent back by the thumb of the other and, with the thumb slowly withdrawing, the leaves fly past the eye in rapid succession giving the illusion of a moving picture. A variety of this form of toy known as the Mutoscope may still be found in use at seaside piers and amusement arcades.

These devices of still motion pictures creating the illusion of motion are due to a characteristic of the eye known as persistence of vision and psychologically referred

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1. Ernest Lindgren, The Art of the Film, p. 19. New York: The Macmillan Co., 1948.

to as the phi-phenomenon.[1] For one tenth of a second after the sudden disappearance of something that has been viewed by the eye it will still continue to be "seen" although the object has escaped from the field of view of the eye.[2] This persistence of vision can be easily demonstrated by merely placing an electric light bulb inside a closed box. A small aperture is cut through one side of the box and a disc with two of its opposite quarter segments cut out is fixed to the near side of the box so that when it is turned the segments remaining pass over the aperture in the box. When the speed of the revolving disc is kept low the light within the box will flicker on and off; however, when the disc is speeded up so that the aperture is uncovered twelve, sixteen or more times per second the light will appear continuously; the moments in between are bridged by the persistence of the light image on the retina of the eye.

Much the same type of visualization appears with the optical toy. It is essential that each picture visualized be stationary, or approximately so, at the moment that it is visualized, and, further, that as the picture is moved from the field of vision, the observor's view be momentarily blocked. If instead of having momentary blocks of vision the eyes were allowed also to see the pictures as they slid

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1. N. L. Munn, Psychology, p. 323. Boston: Houghton Mifflin Company, 1946.

2. Loc. cit.

into and out of the field of vision, the observer would view one continuous blur. When, however, a series of stationary pictures are presented, the persistence of vision bridges the gaps and the illusion of movement persists.

The first of the optical toys of known reference was produced in the year 1834.[1] The second essential of modern motion pictures, the photograph, followed a few years later, 1839.[2] After this event it was but a short time till inventors were attempting to discover an apparatus that would take photographs in rapid succession so that later they could be merged again like in the optical toy in order that viewers would receive the impression of life-like movement. Glass was first experimented with, as a photographic support, but of course had to be discarded as being too clumsy.[3] The English inventor, Friese-Greene, in 1887 patented a rapid action camera for use with perforated strips of paper or other suitable material[4]--he had been experimenting with oiled paper. Finally the solution was discovered by the use of a thin ribbon of transparent celluloid coated with photographic emulsion. The first apparatus to employ the celluloid film

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1. Lindgren, op. cit., p. 21.
2. Loc. cit.
3. Loc. cit.
4. Loc. cit.

was the Edison Kinetoscope, which was patented in 1889.[1] From the Kinetoscope Auguste and Louis Lumiere developed the idea of the projector which they first used to show motion pictures publicly on December 28, 1895.[2] This completed the cycle needed to make the motion picture complete. It should be noted that there exists very little difference between the film of Edison's Kinetoscope and films used today--the only significant difference being the addition of the sound track. In 1903 the first attempt at a fictional story was made in a film entitled, The Great Train Robbery, produced by Edison.[3]

Sound Motion Pictures

Edison experimented with talking pictures, but the perfection of this idea had to await the development of a completely new industry--radio. Edison did make phonograph recordings to use with his pictures, but it was radio that brought amplifiers strong enough to allow a throng of theatre patrons to hear properly.[4] Edison experimented with adding sound to motion pictures as early as 1886; Leon Gaumont of

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1. Loc. cit.

2. Ibid., p. 22.

3. Ray Hoadley, How They Make a Motion Picture. Thomas Y. Crowell Co., New York: 1939.

4. Homer Croy, How Motion Pictures Are Made, pp. 295-307. Harper & Brothers Publishers, New York: 1918.

France made contributions in 1910; Elias Reis of New York, however, finally adapted to film the sound track which is the actual forerunner of present day sound tracks.[1] "The sound picture of the present day was initiated in 1926 by Don Juan, produced by Warner Brothers, and having a musical score synchronized on disks. The following year, the same company released The Jazz Singer with spoken dialogue."[2] Some interesting observations published by an author in the year 1918 on the future possibilities of sound in motion pictures follow:

> The reason why spoken drama, interpreted in action by motion pictures, will never be a success is an interesting one.
>
> The chief source of interest in motion pictures is the constant stimulation they are the means of furnishing to the brain by the fact that part of the story is left out. The mind is stimulated into interpreting the action of the performers on the screen and applying their motives and anticipating their actions more by the fact that the words are missing than if the words were audible. The observer supplies his own words, in his own language, and after his own manner of thought, as art in its highest form always causes an observer to do. The message it conveys to an American and to a Chinaman is antipodally different, as would be the message of a great painting, and each, conceiving his own interpretation, is satisfied with the part he has taken in the play. With the words unspoken, the observer enters into the play and imagines himself a participator more than if some omniscient machine supplied them. Without the words he is free; he interprets the actions as befits his age, experience, and philosophy. With words his imagination is handicapped

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1. Loc. cit.

2. Encyclopedia Brittanica, Vol. 15, p. 857. Encyclopedia Brittanica Incorporated, Chicago: 1949.

> rather than stimulated. Dramaturgically, the coming years will not find talking-pictures a success. With their presentation in their new and advanced form they will be greeted as a novelty and live the life of a novelty.[1]

Colored Motion Pictures

Colored motion pictures are even today making strides toward improvement that began with Frederick E. Ives in 1889. Ives threw objects in color on a screen in stereopticon form and thus antedated the first motion picture by five years.[2] W. Friese-Greene of England experimented with the use of a three colored glass projecting all its colors on each frame of film as it was exposed.[3] Lee and Turner's experiments brought about panchromatic film.[4] George Smith and Charles Urban of England, through a color process they called Kinemacolor, made use of the colors red and green; this method was used to process colored motion pictures of the Coronation of the Durbar in India.[5] In 1912 Gaumont of France projected the first motion picture in three colors.[6] The American Museum of Natural History in New York was the scene

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1. Croy, op. cit., pp. 359-60.
2. Ibid., p. 284.
3. Ibid., pp. 285-9.
4. Loc. cit.
5. Loc. cit.
6. Loc. cit.

of a four-color process named Prizma shown in 1917.[1] Today we are using emulsion processes that act as both the positive and negative film and consist of three colored layers of emulsion. Research is still continuing for the perfect color film. Color has reached a high state of development, but it has not replaced the black and white film.[2]

Motion pictures have progressed, indeed, until their position in both the commercial and military world is unquestioned. In 1937 there were 89,097 motion picture theatres in the world. Approximately five-hundred and fifty feature pictures were produced in the United States and were exhibited to eighty-eight million weekly attendance paying over $1,000,000,000 for the year in admissions at an average ticket cost of 22 3/4 cents."[3] It can further be noted that in the same year the United States produced forty per-cent of the world's total motion picture product representing seventy-five per-cent of the total value of that product.[4] In three and a half years of World War II, eleven hundred Navy training pictures, averaging two reels each, were produced.[5]

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1. Loc. cit.
2. Encyclopedia Brittanica, Vol. 15, p. 857. Encyclopedia Brittanica Incorporated, Chicago: 1949.
3. Loc. cit.
4. Ibid., p. 858.
5. Orville Goldner, "The Story of Navy Training Films," Business Screen, Vol. 6 (June, 1945), p. 29.

In one of these years alone total release prints purchased by the Navy approximated thirty-two thousand miles--this amount could encircle the globe 1 1/3 times and keep a single projector running twenty-four hours a day every day of the year for approximately 8½ years.[1]

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1. L. R. Goldfarb, "Film Procurement," Business Screen, Vol. 6 (June, 1945), p. 84.

CHAPTER III

THE MOTION PICTURE PROGRAM IN THE NAVY IN WORLD WAR II

Overview

Most of the Navy's photographic needs during World War II were taken care of by the Photographic Division of the Bureau of Aeronautics. It should be pointed out that the photographic effort of this Bureau was not confined to its own needs--a considerable portion of its product was devoted to the other Bureaus of the Navy. Originally photography within the Navy was most concerned with aerial reconnaissance and, therefore, when the problem of assigning someone the role of developing various techniques in photography arose in the earliest phases of World War II it was only natural that it should be assigned to the Bureau most experienced with photography.

During World War II over one thousand civilian and military personnel were responsible to the Training Film and Motion Picture Branch in the Photographic Division of the Bureau of Aeronautics.[1] In the Photographic Science Laboratory Branch of this Division were additional hundreds of people who produced high priority and highly classified training films. The Division also had technicians working in the Hollywood and New York facilities. Coast Guard and Marine

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1. Goldner, op. cit., p. 29.

Corps personnel also worked under its cognizance. The Training Film and Motion Picture Branch set the policies and patterns for Naval training film no matter where work was done through its sub-sections of Project Supervision, Procurement, Cataloging and Distribution.[1]

Project Supervision

The largest section of the four was Project Supervision, which was responsible for the research, planning, initiation and follow through on all training film projects. It was concerned largely with production. It supervised photography in the cramped quarters of submarines, in blimps, in the noisy turrets of our battleships and in myriads of aircraft sequences. A project supervisor was usually assigned to each picture from its embryo stages to its finish. He prepared the production outline. With the technical advisor he directed the indoctrination of the script writer in the intricacies of the particular subject. He then got necessary approval of the final script. Next security releases were secured for the crew, and work was begun on "location". He passed on the "rushes" and the editing and gave final approval before the film was officially accepted by the Navy.[2]

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1. Loc. cit.

2. R. E. Furman, "What Is a Project Supervisor?" Business Screen, Vol. 6 (June, 1945), p. 63.

Procurement

The responsibility for the expenditure of funds that made the purchase of the tremendous number of motion pictures possible lay with the Procurement Section of the Navy's Training Film and Motion Picture Branch. Its functions were separated into three broad categories:

> I To negotiate and initiate contracts with commercial producers for the production of Navy training films and other motion pictures;
> II To negotiate and initiate contracts with commercial film laboratories for the processing and printing of training films and other motion pictures; and
> III To purchase other miscellaneous materials necessary to implement the Navy's training film and motion picture program.[1]

With military motion pictures as the final product it is understandable that the contracts made between the Navy and the producers were of considerable importance. The contracts had to be sufficiently flexible in order to protect producers against the contingencies of film production, yet sufficiently rigid in order to insure the Navy a dollar's worth of pictures for a dollar's worth of contract. Weather that, in some cases, held up production 50% of the time was costly. Also expensive were changes made in combat techniques half way through the filming of a picture. Oftentimes after a complete production crew had traveled hundreds of miles in order to secure appropriate pictures of a certain vessel, the ship

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1. L. R. Goldfarb, "Film Procurement," Business Screen, Vol. 6 (June 1945), p. 36.

would be operationally committed to other tasks before the production crew arrived. Since the Bureau of Aeronautics had contrary views toward "cost plus" contracts it is easy to realize how contracts were a big problem in the procurement program. After about two years of various contractual procedures, that were of varying degrees of success, procedures were evolved that proved themselves practical and satisfactory; a step by step analysis of these procedures follows.

After the master script for the training picture had been written and approved, the first step was to solicit price proposals from the many available producers. It was not possible nor practical to solicit proposals from all producers so such items as producer's proximity to the "shooting" locale, experience and skill in the particular type production desired, background as a high or low cost producer, and efficiency in delivering the completed film on schedule were all given consideration.[1] When the producers to be solicited were decided upon, the Project Supervisor visited the producers for purposes of a conference to iron out any details and questions that existed in the producers' minds about the script that was submitted each of them on which to base their estimates. The producers, having all the details accurately fixed in their minds, submitted to the Navy their proposals with a cost breakdown of each. The cost breakdown not only

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1. Loc. cit.

allowed the Navy a survey of the reasonableness of the price of the proposal, but it also gave the producer a logical and orderly method in which to make accurate estimates that would well be done before production commenced. These specifications themselves were placed in the contract so as to protect the producer in case changes later resulted due to reasons beyond his control. These specifications once were not included in the contracts, but later were found indispensable for the protection of all parties concerned.[1]

After all proposals had been scrutinized and weighed according to their individual merits the producer was chosen. The next step was to get approval of the producer's proposal from all interested Navy parties; the request to the Contracting Officer of the Bureau of Aeronautics to award a contract to the producer selected followed.

After the contract had been awarded and the producer commenced production, the Navy may have seen fit to make various changes to the script. These changes varied from sundry small items to major changes involving changes in locale, length of production, etc. The changes in cost involved because of changes in production were usually approved by the production supervisor when below a certain level, and by the Bureau when of greater magnitude. In cases where the cost involved did not reach the price estimated in the

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1. Loc. cit.

contract, the contract price was redetermined and reduced accordingly. The procedures discussed here were the major responsibility and function of the Procurement Section. Other procedures related to these should be mentioned; they were such duties as approving invoices for payment, maintaining adequate supplies of raw film stock, allocating raw film stock to producers, preparing the annual budget of the Training Film and Motion Picture Branch, liaison with other Army and Navy activities, maintaining numerous records, and reviewing procurement procedures for continued effectiveness.[1]

Cataloging

The Cataloging Section of the Navy's Training Film and Motion Picture Branch had two main functions:

I. To accumulate and to maintain records on:
   A. Films produced by the Navy,
   B. Films from other sources having potential use in the Naval Establishment, and
II. To disseminate film information throughout the Naval Establishment:
   A. During production of each film, and
   B. After its completion.[2]

Actually the Cataloging Section was concerned with all stages of the life of a Naval Training Film. The Section's first function was to assign a number to a proposed film, by which number the film would be known in the Navy during its entire existence. As the film passed from Project

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1. Goldfarb, op. cit., p. 84.

2. J. H. McLelland, "Check With Cataloging," Business Screen, Vol. 6 (June 1945), p. 32.

Supervision to Procurement and to Cataloging for various phases of initiative the Cataloging Section entered the picture several times in order to accumulate proper information for later dissemination. Production outlines, action outlines, story boards, scripts, correspondence and reports of all kinds represented the source materials from which Cataloging received its fund of information. This fund of information was used later to perform the second major function of Cataloging--that of disseminating information. A weekly Film Log was maintained and as each of the several hundred films currently in production reached any one of several production mileposts that fact was recorded therein. This process was found expedient for two reasons: first, to keep production-supervisors informed of what was going on in their own and related fields; second, it was frequently found possible to correlate production activities on two seemingly uncorrelated subjects in order to save time and expense.[1]

The film catalog, kept up to date by means of cumulative monthly supplements, was issued every four months listing all the films available to the Naval Establishment. The information pertaining to every film included:[2]

I. Navy serial number.

II. Title.

III. Security classification.

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1. Loc. cit.

2. McClelland, op. cit., p. 33.

IV. Running time.

V. Date of release.

VI. Whether the prints were in color or black and white.

VII. Whether the film was silent or sound.

VIII. Description of film content.

The Cataloging Section also, through checking other film sources such as the Army, commercial concerns, and the Allied Nations, was often able to secure films much more quickly and economically than it would have been possible to produce such films to fill the same need.

Distribution

During the war some 40,000 prints of training films were distributed to Navy personnel monthly.[1] The function of distribution actually began before the Navy produced the picture through consideration of questions that had to be answered during the early stages of production. The questions to be answered were: 1. Who comprised the intended audience? 2. What would the size of the audience be? 3. How many prints were needed? 4. Where would the prints be sent?

The supplying of the prints was also the responsibility of the Bureau of Aeronautics. The Requesting Authority, which requested production of the film, also forwarded a request

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1. Ernest Martin, "Distribution's Double Duty," Business Screen, Vol. 6, (June 1945), p. 38.

for distribution of required prints along with the request for production. Aviation film distribution needs were prepared and submitted by the Distribution Unit in the office of the Chief of Naval Operations. Distribution needs for all other type films, the largest of the two categories by volume, were either prepared or screened by the Bureau of Naval Personnel before being presented to the Bureau of Aeronautics.

Upon receipt of the distribution lists by the Distribution Section of the Training Film and Motion Picture Branch the lists were coordinated. The Section also determined print orders and placed them with film laboratories according to priorities. Shipping was made from one of the established centers in Washington, New York and Hollywood. From these three points films were distributed to selected schools, training centers or ships, or to film libraries. Officers in charge of the film libraries were given the responsibility of distributing films within their area or district.

Training Film Libraries were established in each Naval District, at important Naval Air Stations, and at strategic locations overseas. The Bureau of Naval Personnel, the Chief of Naval Operations, the Commandant, Marine Corps and the Commandant, Coast Guard had cognizance over existing training film libraries and each provided training films as needed.

The initial distribution phase was but a small part of the overall distribution program. A larger volume was handled by reprints in order to satisfy the growing needs

of the Navy. Other agencies were combed for their possible contributions and of 7,000 subjects being distributed at one time during the War only about one-half were produced by the Navy itself.[1]

During World War II approximately 1,300,000 prints were supplied to the entire Naval Establishment, most of which were 16 millimeter sound motion pictures in black and white.[2] Colored films approximated 10% of the distributions.[3] In the earlier phases of the war when most of the intended audience was in the training centers, most training films were distributed to shore stations; however, during the last year of the war approximately 75% of the training films were utilized by the forces afloat and advanced bases, whereas only 25% were provided for the shore establishments.[4]

Production Techniques

The Navy's techniques of production that allowed for the correct and proper amount of training were basically similar to those techniques utilized by other agencies. An analogy of the techniques and effects utilized by artists in painting a mural might introduce this problem best.

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1. Loc. cit.
2. Loc. cit.
3. Ibid., p. 39.
4. Loc. cit.

To accomplish the painting of a mural of the epic Battle of Midway, five different artists would very likely use five different techniques as well as five different sets of equipment to arrive at their desired result. Each end product would probably fully accomplish portraying appropriately the Battle; however, as patrons of art should pass by each masterpiece, there very likely would occur a different effect in the minds of each of the passers-by. Of one mural various comments would probably be heard such as, "That, I like"--"It's certainly well done"--"How revolting"--"I don't like that," etc., but it can be rather certainly assumed that one of the murals would mean more and mean it more effectively than would the other four.

Despite the fact that, given the same specifications, research data, tools, equipment, and material for the development of a theme in a mural, the end results can be different because of two factors--the quality of the craftsmanship expressed in the use of tools, equipment, and materials, and the appropriateness of the imagination applied to the interpretation of research data which we assume to be the truth."[1] The training film, like the mural, is the result of basic factors that lead naturally to the development of their own method of presentation. Goldner says:

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1. Orville Goldner, "The Training Film Formula," Business Screen, Vol. 6, (June 1945), p. 55.

A qualitative analysis of any training film reveals the following ingredients in the order of their application in the training film production process:

(1) The truth about a condition or set of conditions.

(2) Interpretation of the truth as it relates to human behavior.

(3) Visualization of the interpretation of the truth in a way that will permit individual identification with it.

(4) Verbalization of the interpretation of the truth in terms and in a manner that will permit the relatively effortless development of definite behavioral concepts.

(5) Emphases, both visual and audible, which emanate naturally out of the interpretation of the truth (2,3,4 above), and which will add to the immediate and retention value of the whole.[1]

An amplification of the five ingredients necessary in the training film production process presented above is necessary in order that they be properly understood.

(1) The Truth About a Condition or Set of Conditions. This is the first step that must be considered in the production of a training film. The truth will not be known until all the available sources of available data have been searched for the facts. Searching out the truth includes:

(a) Research in books, manuals and reports.

(b) Visits to those localities where the subjects to be photographed and presented exist--this, in amplification of and/or in opposition to what has been learned from reading material.

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1. Loc. cit.

(c) The conducting of interviews with persons intimately familiar with the operation of the subject equipment.

(d) The review of other motion pictures or audio-visual material already produced in the same or allied fields.[1]

The research indicated above requires the best efforts of those persons who are especially qualified in such methods. They must be persons not satisfied with a mere perusal of the "surface material" and who have the ability to search out primary sources so that only the naked truth is utilized in the presentation of the problem. This process was especially difficult in the Navy's production of training films in the late War since its films dealt primarily with the operation of weapons of warfare--these weapons include such varied items as machine guns, battleships, aircraft, tactics and mechanized personnel. Methods of operation changed necessarily from day to day as the situation developed and, consequently, research had to be continuously conducted even while the production of a particular training film was being expedited. At times, where the changes in methods were too dynamic, production was necessarily "frozen" until the proper methods stabilized themselves.[2] This first ingredient

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1. Loc. cit.

2. Ibid., p. 56.

required primarily an acute mind and a knowledge of research techniques.[1]

(2) Interpretation of the Truth as It Relates to Human Behavior. This step, by its title, implies that a given audience will experience human behavior in a different fashion at different age levels. It depends upon such items as environment, experience, education and the heritage of those individuals that make up the audience.[2] The content of the film having been based on the original research (step 1) was delimited in scope in order to apply to its defined audience. A thorough knowledge of the objective of the film plus the curriculum it would fit into, if a curriculum existed, were necessary in order to establish the needs of the audience. In those cases where it was determined that the film was not intended to fit into a given curriculum--that is, was to "stand on its own feet"--a different interpretation of the truth had to exist. That is, the subject matter was made more general, with an introduction and a review or summary added. A knowledge of the construction of training films was considered essential in this second step.[3]

(3) Visualization of the Interpretation of the Truth. This third step required a "picture mindedness."[4] It required

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1. Loc. cit.
2. Loc. cit.
3. Loc. cit.
4. Loc. cit.

a complete visualization of the final production with its various sequences in such a way that they could be properly verbalized in a script. The script had to show all the related "truths" in such a way that a cameraman, or anyone later associated with the production of the film, could transpose the verbalization to the pictured whole and arrive at the originally desired goal.

Visualization may utilize any technique necessary in order to achieve its desired result. In many cases this involves the use of drawings where the subject matter demands it, such as in the fields of surgery, celestial navigation and weather. Regardless of the method used it must contribute in such a way to the production process that the individual learner will identify himself with the motion picture no matter what he sees.[1] "For he must 'feel' the visual experience as a mental-emotional entity. There must be an experiential bond, a kinesthetic response to the actions pictured. Vicariously he must get as close to actual experience in a specific area as is possible."[2] Then, if he does, adequate and effective learning will take place. It requires that the process will allow all the technicians necessary in such a production to get in moving pictures what is necessary in order that the proper and desired effect is realized.

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1. Loc. cit.

2. Loc. cit.

Cameramen, animators, carpenters, scene painters, laboratory technicians, actors, directors and many others are all a part of this function. Visualization is the most important of the five steps necessary in the training film production process.

(4) Verbalization of the Interpretation of the Truth. Verbalization merely involves the use of words with the motion picture. Since words are easily used and easily changed their use is to be especially scrutinized so that they always give proper identity and that they not be used if a picture can give the same or better result. Three conditions are important in the use of words in training films, according to Goldner:

> (1) The vocabulary must be "geared" to the audience. The words used must not be 'over their heads," or have a "talk-down' effect.
> (2) Words should be used only where absolutely necessary to an understanding of the picture. Words should not be used for themselves alone.
> (3) Voices and voice quality used for narration and dialogue must give the impression of understanding the subject matter. They must be "voices of experience' talking personally to, and not impersonally at the audience. There must be no"selling" but rather sincere and straightforward "informing."[1]

The words must fit the pictures and both should fit the audience so that definite behavioral concepts can take place in an effortless manner. The important feature of this step to be emphasized is that writers must be "seeing' writers, in that they realize that in the motion picture media it is

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1. Loc. cit.

more important to visualize than to verbalize. Using this technique, motion pictures will become pregnant with meanings.

(5) Emphases--Visual and Audible. This, the fifth step in the proper formula for the training film production process, is the most difficult to explain because it involves all of the various techniques peculiar to the motion picture process. These techniques or devices include the whole of optical effects and screen devices, music, sound effects and many others. The important point is that they must be naturally accepted as a part of the film and add to the truth as it was originally conceived to exist. Humor, music, wipes, dissolves, fade-ins and -outs, double exposures and montages are all valuable screen devices, but they must contribute naturally to the subject matter in such a way that they increase the learning process and add to the retention of the subject matter. This step requires the best efforts of all the technicians associated with the production of the training film. It requires, in the final analysis, a high degree of skill so that only those techniques that contribute to the learning process are synthesized properly and in a logical and effective manner.

CHAPTER IV

THE INFLUENCE OF MOTION PICTURES

Background

The question of the influence of motion pictures, especially on the learning processes, has existed since the conception of motion pictures. Many of the earlier studies dealt with their influence on children and, therefore, it is easily understood why The Committee on Educational Research through the Payne Fund made studies covering the period up to 1933 as to this influence in its relation to the growth and development of the child.

The committee came to the conclusion that the motion picture, as such, was a very formidable means of learning for children; they based their findings on a comparative study of the learning of adults and children.[1] A movie was selected in which a group of 'superior' adults (college professors, graduate students and their wives) saw, as determined by a test given subsequent to the presentation of the movie, a little less than nine-tenths of what had been previously determined as factual information presented. Children of various ages also viewed the film and it was determined that:

I. The eight or nine year old child saw and remembered half of what he saw;

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1. W. W. Charters, Motion Pictures and Youth. New York: The MacMillan Co., 1935.

II. the eleven or twelve year old saw and remembered two-thirds;

III. the fifteen or sixteen year old saw and remembered four-fifths;

IV. second and third grade children, six weeks after having attended the motion picture, remembered 90% of what they recalled in I. above;

V. three months later, the eight or nine year olds recalled as much as they did six weeks after having attended the movie.[1]

In summary of the above, Charters states:

> Hence roughly speaking a parent who is a superior adult can count upon his young child to see approximately three out of the five things he sees, his eleven or twelve year old child to see three out of four, and his fifteen or sixteen year old to catch nine out of ten. Or putting the conclusion in another way the eight or nine year old sees half of what is to be seen, the eleven or twelve year old two-thirds, and the fifteen or sixteen year old four-fifths of what is to be seen...At all ages including the adults the slow drop of the curve of forgetting is striking.[2]

Hoban, in 1937, saw even greater possibilities of motion pictures than others in the field at that time:

> Yet, in the motion picture there is a medium of instruction which has uses and values far beyond the possibilities now realized. It is not improbable that the future will see the motion picture used not only as a teaching tool supplementary to

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1. Loc. cit.

2. Ibid., pp. 8-9.

textbooks, but also as a primary mode of experience out of which other educational activities arise.[1]

In situations where the same learning must take place among the less learned as well as among the more scholarly, the motion picture is an instrument of merit. In one situation where photoplays were used to teach a large cross section of children, Dent states This contribution was of such magnitude that average children with the aid of photoplays learned as much as bright children did without them.'[2] He also records that recruits in the armed forces learn better and faster with the use of the motion picture.[3]

Various advantages that accrue through the use of motion pictures were recorded by Hoban who used a study by the American Council on Education of twenty-five hundred educational films based on fifty-six hundred teacher and two thousand student judgments:

I. Motion pictures add continuity of action.

II. They eliminate irrelevant detail.

III. They provide the best possible view of the phenomena at the user's convenience.

IV. They can express time accurately, but still compress or expand the actual process involved.

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1. C. F. Hoban Jr., The Motion Picture in Education Its Status and Its Needs, Series II, Vol. I, No. 1, Washington, D.C.: American Council on Education, April, 1937.

2. E. C. Dent, The Audio Visual Handbook, p. 24. Chicago, Illinois: Society for Visual Education, Inc., 1949.

3. Ibid., p. 4.

V. They can, through animation processes, provide sequences otherwise unobservable to the student.[1]

He further concluded in the same study that motion pictures developed rational control of emotions, critical thinking, and student-initiated activities and attitudes.[2]

At the conclusion of World War II, Hoban was able to summarize research findings relative to the use of films, in which he indicated: the ability of motion pictures to stand on their own feet in dynamic education, that motion pictures should adapt themselves to present day curricular trends and allow for student expression, their effect on student activities especially as they evolve within the local community, their development of habits of inquiry within the students, and the proper development of attitudes and values.[3] As a result of his experience with wartime films, Hoban further concluded that motion pictures can:

I. teach the proper concepts of social attitudes and ethics on a mass basis;

II. encourage individual initiative;

III. heighten interest in the curricula;

IV. teach better various skills than other procedures can;

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1. C. F. Hoban, Jr., Focus on Learning, p. 25. Washington, D. C.: American Council on Education, 1942.

2. Ibid., pp. 80-102.

3. C. F. Hoban Jr., Movies That Teach. New York: Dryden Press, 1946.

V. develop team-work better among the learners;

VI. present material psychologically rather than "pseudo-psychologically;

VII. give assistance in the development of control of the emotions.[1]

The areas in which motion pictures had such a complimentary effect were earlier conducted by Freeman in social studies, penmanship, physics, home economics, English, and health education;[2] by Goodman in safety education;[3] by Aconspiger in music;[4] by Rulon in general science;[5] by Hausen in biology;[6] and by Consitt, Knowlton and Wise in history.[7,8,9] Clark and Rulon described their beneficial effect

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1. Loc. cit.

2. F. N. Freeman, Visual Education. Chicago: University of Chicago Press, 1924.

3. David Goodman, "The Comparative Effectiveness of Pictorial Teaching Materials," Educational Screen, Vol. 2, pp. 358-59, 1942.

4. V. C. Aconspiger, Measuring the Effectiveness of Sound Pictures as Teaching Aids. Teachers College Contributions to Education, No. 505, 1933.

5. P. J. Rulon, The Sound Motion Picture in Science Teaching. Harvard Studies in Education, Vol. 20, 1933.

6. J. E. Hausen, "The Effect of Educational Motion Pictures Upon the Retention of Informational Learning," Journal of Experimental Education, Vol. 2, pp. 1-4, 1933.

7. Frances Consitt, The Value of Films in History Teaching. London: Bell & Sons, 1931.

8. D. C. Knowlton and J. W. Tilton, Motion Pictures in History Teaching. New Haven: Yale University Press, 1929.

9. H. A. Wise, Motion Pictures as an Aid in Teaching American History. New Haven: Yale University Press, 1939.

in the development of critical thinking;[1,2] Consitt depicted their ability to develop an understanding of the background of characters and events in history;[3] Eichel explained their ability to allow retention of imagery concepts for a long period of time;[4] Aonspiger, Freeman and Wise all developed the concept of their ability to increase the fund of information;[5,6,7] Hausen, Knowlton, Tilton and Goodman described their ability to allow for longer retention of information than when other materials were used;[8,9,10] their ability to stimulate interest had been developed by Westfall, Wittich and Freeman;[11,12,13] their knack of developing voluntary

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1. C. C. Clark, "Sound Motion Pictures as an Aid in Classroom Teaching," Unpublished Doctoral Dissertation. New York University, 1932.

2. Rulon, op. cit. 3. Consitt, op. cit.

4. C. G. Eichel, "An Experiment to Determine the Most Effective Method of Teaching Current History," Journal of Experimental Education, Vol. 9, pp. 37-40, 1940.

5. Aonspiger, op. cit. 6. Freeman, op. cit.

7. Wise, op. cit. 8. Hausen, op. cit.

9. Knowlton and Tilton, op. cit.

10. Goodman, op. cit.

11. L. H. Westfall, A Study of Verbal Accompaniments to Educational Motion Pictures. Teachers College Contributions to Education, No. 617, 1934.

12. W. A. Wittich, Audio-Visual Paths to Learning. New York: Harper, 1946.

13. Freeman, op. cit.

reading was recorded by Consitt, Hoban, Knowlton and Tilton;[1,2,3] their ability to modify social attitudes was related by Dale, Peterson and Thurstone;[4,5] and their ability to increase proper and purposive social responses were brought to light by Bell, Knowlton, Tilton and the Tower School Staff.[6,7,8]

Selection of Films

After the instructor has decided upon the type of behavior he desires to develop in his students he must be careful to choose the proper film in order that he may reasonably expect that behavior to develop.[9] All films are not alike

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1. Consitt, op. cit.
2. C. F. Hoban Jr., Focus on Learning. Washington, D. C.: American Council on Education, 1942.
3. Knowlton and Tilton, op. cit.
4. Edgar Dale, Audio-Visual Methods in Teaching. New York: Dryden Press, 1946.
5. R. C. Peterson and L. L. Thurstone, Motion Pictures and the Social Attitudes of Children. New York: MacMillan, 1933.
6. Reginald Bell, et al., Motion Pictures in the Modern Curriculum. Washington, D. C.: American Council on Education, 1941.
7. Knowlton and Tilton, op. cit.
8. Tower School Staff, The School Uses Motion Pictures. Washington, D. C.: American Council on Education, 1940.
9. Wittich, op. cit.

in their methods of development of the subject matter and instructors must realize the capabilities of their students so that students are led from their present field of knowledge to the area in which the instructors desire to lead them. Vocabulary is important in this field.

Each film that is selected by the instructor for presentation should be carefully viewed so that it is considered to "fit" with the past experience of the students and so that it will tend to "pave the way' for students in their future learning. The film having been selected should next be previewed so that it may be determined that it implements the developed training formula. Students must be guided through their past references to the subject matter at hand in the film so that the material to be presented will be meaningful. This does not mean merely a period spent in recall questions. It means a development of judgments and evaluations, of attitudes and a distinct correlation with the everyday living habits and surroundings of the students.[1]

The showing of motion pictures in the training process are not to be considered terminal experiences, but rather the development of interests that will further motivate the trainee to learn more.[2]

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1. C. F. Hoban Jr., Movies That Teach. New York: Dryden Press, 1946.

2. Wittich, op. cit.

Certain factors that should be considered by all those involved in the selection of films for a training program, or even by those considering the production of a film, follow and are primarily based on the research of the American Council on Education. Hoban emphasizes a number of points to be properly considered.[1]

I. Maturity of the student. The younger student is concerned more with the detail of what he sees; the older student is more interested in the interpretations he makes of what he sees. The older student becomes more critical of the acting and photography.

II. Interest is greatest when the characters portrayed are nearest in status to the students.

III. Characters portrayed of the same sex are preferred. Males prefer males and vice-versa. If characters of both sexes are portrayed those in the audience will prefer the activities of those of their own sex.

IV. Students will react more readily to unfamiliar persons in familiar settings or to familiar persons in unfamiliar settings.

V. "Pacing" of the film to suit the audience is necessary; that is, the film should not be too difficult for the audience to follow nor too simple so that their interests stray. Hoban found that the

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1. C. F. Hoban Jr., Focus On Learning. Washington, D. C.: American Council on Education, 1942.

application of certain principles aided this factor: they were:[1]

A. The scenes must be of the proper length--long enough so that the audience is able to absorb what is to be seen.

B. Scenes should be deliberately repeated in the film where the action involves intricate or complicated procedures, or where involved emotional portrayals are made.

C. Those scenes that involve a major element of importance in the learning process for a given procedure should be followed by a psychological pause--a period in which what has been shown may be absorbed. This is based on the theory of retroactive inhibition. The retroactive inhibition theory simply means the inhibition by present activity of memory of previous activity. It is one psychological theory of forgetting. Scenes previously shown will tend to be forgotten if the presentation of materials is too rapid. This offers an explanation of why some training films, because of their rapid presentation of the factual data, sometimes tend to confuse students.

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1. Ibid., pp. 94-95.

D. A depth and variety of meaning must be given to the subject matter through the use of repetition or varied presentation of the same material. It is not simple repetition that is important here, but rather repetition in a variety of meaningful ways that adds to the knowledge of the learner. "Learning is like bathing--a bath is best where there is time for soaking, lathering and splashing around in the water--not just an in and out dip in the tub or in the shower.[1]

E. The commentary must be such that it meets the audience at the level that the audience wants. The language must be such that the audience does not feel it is being talked down to; it must not be bookish; it should be such that it arouses interest and arouses the curiosity of the learner. It is not meant that the language be in dialect or that slang be employed.

In motion pictures people are not just interested in ships, but ships maneuvering at sea; not in sailors, but in sailors performing their tasks of endeavor; not just in aircraft, but in aircraft going through their maneuvers.[2]

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1. W. J. Iverson, "A Definition of Teaching Competencies with Audio-Visual Materials," p. 25. Unpublished Doctoral Dissertation, Stanford University, Stanford, California, 1948.

2. Hoban, op. cit., p. 145.

A film has good organization when its story is woven around the lives of people. It includes all techniques such as close-ups, cartoons, maps and diagrams that cannot be photographed in action.[1]

Hoban added other measures that should be applied to training films:[2]

I. Retention is effected by the method of presentation. The force and vividness of portrayal lends itself to better retention than merely the importance of the subject portrayed.

II. Commentary to films must be adequate, natural and clear. The audience will resent being "sold a bill of goods."

III. Action should be portrayed in preference to talk about action. Audiences would rather see the action take place than be told about it.

IV. Special effects, such as wipes, dissolves, fast-motion and slow-motion must not be too complicated to be understood.

V. "Stock shots" are to be avoided. Students are annoyed when they see the same "shot" repeatedly used in various films, although such usage leads to economies.

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1. Loc. cit.

2. C. F. Hoban Jr., Movies That Teach, pp. 87-106. New York: Dryden Press, 1946.

VI. "Over-selling" should be avoided. More mature students, in particular, dislike being made the tools of obvious and clumsy propaganda.

VII. The use of slapstick is to be questioned. Although many audiences clamor for the use of humorous cartoons they often laugh off the learning. Dialogue or film commentary, if too humorous, may also nullify some of the learning that could otherwise take place.

VIII. Theatrical techniques, although sometimes adding to the entertainment value, must be used with discretion so that they do not detract from the learning.

IX. Good teaching films follow a basic structure.

A. The introductory sequences should be on a ground familiar to the students. They serve to allow the student to identify himself with the film and draw out his interest so that his motivation may reach a maximum. They serve to establish a rapport with the student.

B. A detailed presentation is given using demonstrations, dramatizations and explanations that are suited to the capabilities and background of the audience. It presents the skills necessary to meet the situation.

C. After the main presentation of the film the points to be emphasized are summarized, thus

providing an intellectual summing up for the student of the film.

D. The film then motivates the learner, in the final analysis, in such a way that he desires to continue learning so that he may perform operations he saw in the film.[1]

An Evaluation of Motion Pictures in Dynamic Learning

In order to properly evaluate motion pictures as an aid to learning, an experiment was conducted by the Army Air Forces in which three different groups of aviation cadets were taught position firing through the use of a film, a manual, and a lecture.[2] A fourth group was added, for control purposes, with no training so that their score on tests could be used as a base line for the scores of the other three groups. The four groups were selected at random from a total of 480 aviation cadets, which number was reduced to 456 after eliminating those with previous knowledge of the subject; thus each group contained from 100 to 130 men. The film had been produced through the best efforts of the instructors, writers of training literature, and professional film producers. It was of 15 minute duration, animated, presented

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1. C. F. Hoban Jr., Focus on Learning, p. 103. Washington, D. C.: American Council on Education, 1942.

2. J. J. Gibson, Motion Picture Testing and Research. Washington, D. C.: U.S. Government Printing Office, 1947.

with commentary in logical order and contained a minor plot with humor. The manual was pocket size, fifty pages in length, employed latest visual methods with excellent colored diagrams, had a minimum of text and was studied by the groups without discussion or explanation. The half-hour lecture was given and organized around nineteen lantern slides, having been written, rewritten and memorized for the actual lecture period. It was not pedantic, it employed good face-to-face teaching, had a question period, and as given in its final form was considered by two college teachers to be excellent instruction. All three methods utilized the best techniques possible and covered the same fourteen basic points of subject matter previously agreed upon. The tests given after each of the groups had been exposed to a method of learning were based around the basic fourteen points of instruction. Some questions were pictorial rather than verbal, of the objective five-choice type, overlapping in them was omitted, and re-editing eliminated misleads. From the great number of originally selected questions twenty-five were finally agreed upon to be given that would cover the basic points. The questions' mean level of difficulty immediately after testing was about seventy percent and about fifty-five percent when tested two months later.

The results of the test indicated that the film was superior in amount learned immediately, it was superior in amount remembered after two months, it was superior immediately

after training for the lowest and highest thirty percent of each group in intelligence, it was superior for the same thirty percent lowest and highest in intelligence two months after training. It might be interesting to note that the manual was second best in the tests immediately after training and the lecture was second best in the tests given two months after training. The statistics were proved significant as for differences between motion pictures and the other methods, but they were not significant in differences between the lecture and the manual. The manual and the lecture were rechecked as to content and it was decided that they were equivalent and in some cases better than the motion picture film. It was concluded that the reasons for superiority of the film method were because of its ability to, first, better teach "dynamic" learning--learning dealing with variation and relations of one item with another; second, it is better to teach with movies the subjects that deal with use or human action meanings since they are difficult to describe in words or static diagrams. The motion picture was better able to do in fifteen minutes than what the lecture was able to do in a half hour. From the military standpoint of mass training a conclusion of importance is drawn in the study that "the effect of good motion picture instruction on the learning of certain kinds of specified achievements is to reduce the variability of the achievement among the trainees and to put them more nearly on an even footing."[1]

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1. Loc. cit.

CHAPTER V

A REVIEW OF THE FILM RESEARCH PROJECT AT PENNSYLVANIA STATE COLLEGE

Background

Probably the most exhaustive and thorough study that has ever been made in the field of application of motion pictures to a training program is the Instructional Film Research Program being conducted at Pennsylvania State College, subsidized by the United States Navy and under the direction of Dr. C. R. Carpenter. The nature and purposes of these studies have been simplified by Finstad.[1]

1. Studies which deal specifically with audio and visual perception, such as the effect and the most appropriate use of color and music in film presentations.
2. Studies which seek the effects on learning of idea density, length of films, and concentrated use of films.
3. Studies which examine the effectiveness of training films that incorporate such teaching principles and techniques as questioning, learner participation, and other forms of motivation which, if successful, would allow the film to assume a greater proportion of the complete teaching job.
4. Studies which involve actual production of model films, utilizing and exemplifying discovered principles, and testing the teaching power of these films.
5. Mechanical scoring and performance testing devices, essential to statistical handling and which may have possible byproduct value in future utilization of films.

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1. Allan Finstad, "The Navy Looks Forward in Audio-Visual Education, U.S. Naval Training Bulletin, (November, 1948), pp. 22-23.

The Instructional Film Research Program, at this writing, is still being conducted at Pennsylvania State College and the final conclusions have not been drawn from it. However, the director, Dr. C. R. Carpenter, drew up a general summary of the trends of the results in June, 1949--a synopsis of this summary follows.[1]

Introduction

Up to June 1949 two years had been devoted to the research. Fifteen-thousand subjects had taken part in the experiments, thousands of man hours had been spent and large sums of money had been invested. The purposes of the program had constantly kept in mind--the conducting of research from which facts would be obtained that would point the way toward proper production and utilization of motion pictures so that large numbers of personnel could be trained in a minimum amount of time.

After these two years of research, the directors of the Program felt that vigorous scientific research based on the systematic theories of learning, perception, and attitude formation would give the proper skeletal framework for the research. This was decided upon in lieu of such other researches that had utilized panels of experts, audience "likes and dislikes," "principles of art appreciation," and analyses

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1. C. R. Carpenter, 'General Summary of Trends of Results: The Instructional Film Research Program 1947-1949,' Progress Report No. 11-12. Pennsylvania State College--School of Education, June 30, 1949.

of specific factors that prevailed in existing instructional films.

The task was divided into two parts: (1) Application of the laws of learning to the dynamic medium of the motion picture. The endeavor in this field was to determine exactly how these laws applied to the dynamic medium of the motion picture; then upon their exact determination it would be possible to reorganize these principles to the motion picture. (2) The application of the new laws to the radio, films and television. It seemed altogether probable that upon the completion of the task new laws of learning might develop.

Trends of Research Results in Film Production Procedures

I. Pre-production testing.

A. The objectives of the film should be explicitly determined prior to the task of script writing.

B. Both instructor specialists (educational or psychological advisors) and subject-matter specialists (technical advisors) are to be consulted in order that proper content and presentation follow.

C. Pre-production testing should be done. It should measure the degree to which the film will accomplish the desired objectives, as originally decided upon or as later modified. These tests can be made, as appropriate, to the script, the

story-board, or film-strips with accompanying commentary. The tests should be given to sample populations that are as nearly similar to the trainee population as possible. Before being released the film should be tested and evaluated objectively in terms of its actual instructional performance standards. The results of these tests should be released to the instructors who will utilize the films in their curricula, and their limitations and performance levels should be stated.

II. Film production and audience characteristics.

A. It is a foregone conclusion that the exact capabilities of the ultimate trainee audience should be supplied to the technical and educational advisors as well as to the writers, directors and editors who form part of the film production process. Such characteristics of the trainees as the following should be known:

1. Intelligence level.
2. Previous knowledge and training in the substance of the film.
3. The existing patterns of general or specific interests.
4. The probable degree of motivation by the trainee audience.

5. The probable need for the information contained in the film.
6. The degree of verbal comprehension.
7. The level of comprehension of technical aspects of the film.

B. The limited range of the film objectives has become more and more evident. In other words, films that are slanted toward an audience with general abilities and general subject matter interest will be less effective than those designated for a specific audience with specific objectives.

C. The pacing of the film should be appropriate. The more familiar training films are primarily of a dramatic or entertaining nature. Training films for a military audience must take into consideration the present abilities and background of the students and must be varied accordingly. The level of difficulty of the subject matter itself will affect the pacing of the film.

D. The showing of errors in a training film is still under debate; however, it is felt that probable errors that might occur in actual performance should be slowly and deliberately shown in the film.

E. The camera angle used in filming has been discovered to be unequivocally important. In showing performance skills the camera should assume the same position in relation to the task being performed as the trainee will take in performing the task.

F. Too many times the present day instructional film serves only as a background to the commentary. All too often the film and commentary are not closely enough integrated in order that the full impact of the film can be realized. Factors in this area which have been investigated by the Program are:

1. Level of verbalization. Too many as well as too few words can be used in the commentary. With due regard to the audience and the subject matter, tests should be given for each film to determine the optimum level for the amount and kind of verbalization. Regard must be given to the degree of comprehension of the audience as well as the difficulty of the vocabulary.

2. Phase relations. Much interest has been shown in this field in which it is being determined whether the commentary should precede, follow, or coincide with the visual

cues in the film. With some films, "leading" with the commentary is found desirable, whereas with others "lagging" of the commentary is to be desired.

3. Form of address. In studies to determine whether the use of the first person, second person, third person, or imperative forms should be used in the commentary, it has been determined that, for military personnel, the use of the imperative form is to be favored. The least favorable results were obtained through the use of the third person passive.

G. The usage of color versus black and white films has been investigated and research is still continuing in this area. Results to date have shown no significant advantage in the use of color, except in those cases where color was important as a cue to the learning process.

H. Films accompanied with "matched music" and films with no musical accompaniment have been studied and no significant differences exist in the amount of learning that takes place. Research in this field is continuing.

Trends of Research Results in Film Utilization Procedures

I. One of the basic considerations of the entire Film Research Program has been the investigation of

whether or not instructional films may be used exclusively in a training program--that is, without the aid of other instruction. In order to give maximum support to the cause of motion pictures it was originally determined to produce several pictures that would be slanted with this thought in mind. However, excessive time and expenses that would be involved precluded this procedure. Instead several pictures already in existence with subject matter in the general scientific field were used, and the results indicated that films could be used as an exclusive means of instruction.

> The trends of results confirm this hypothesis. Furthermore, it is believed that if an integrated series of films were designed according to presently known principles and produced for teaching specific subject matter to audiences or classes of known characteristics, the series could do a highly effective instructional job in a shorter than average period of time. This could be achieved without the presence of well-trained instructors and without having actual equipment present in classrooms.[1]

This is a confirmation of the Air Force Experiment recorded by Gibson,[2] of Hoban's early dreams,[3] and is of particular significance to the military services

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1. Carpenter, op. cit., p. 8.
2. Supra, p. 44.
3. Supra, p. 32.

which, in times of emergency, are usually confronted with the training of countless numbers, with inadequate instructors, and under conditions that put a premium on time.

II. The results tabulated concerning massed versus distributed learning with films indicate that films can be made three or four times longer than the average Navy training films now in existence (about seventeen minutes in length) with no loss in the amount of learning. Therefore, it is probable that films of the future can easily run into one-hour's length per training period.

III. Introductions and summaries of training films that are "built in" the films themselves have brought the conclusion that, if planned and utilized properly, no further introductions or summaries are necessary.

IV. Learner participation experiments were conducted where the learners themselves repeated answers to questions in the films, and where they followed action as it occurred in the film. "Audience participation," as it is now conceived in this field did not add to or increase the learning of the trainees in these experiments.

> Thus it would seem that the speed of development or rate of presentation of the films must be slowed down for complex knots, or other tasks, so that all members of the audience may <u>actually</u> tie the knots without

> becoming frustrated, inhibited and confused. Frustrated attempts retard (inhibit) learning. The present trend of thought still includes the hypothesis that practicing a response facilitates learning, but it is required to know specifically what the best conditions are for practice, what acts need to be practiced (both overtly and symbolically), and what degree of practice is required for maximum learning effectiveness. Furthermore, it is believed that procedures used to secure participation must not interfere with the organization of the material to be learned, nor distract from the essential facts to be learned, nor create adverse sets or attitudes on the parts of trainees."[1]

V. Repetitive showings are usually disliked by both the instructors and the students; however, the research indicates that two or three showings of the same film increase the amount of learning. Training films are usually packed with factual items that are presented at a very rapid pace, so that retroactive inhibition and a missing of the various points of importance must be guarded against. Thought should be given to splicing together two prints of the same film and presenting them at one "sitting."

VI. Study guides that can be used by the students at times other than when viewing the training films, and which cover in review form films already seen, have been shown to be a great aid to the students.

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1. Carpenter, op. cit., p. 10.

New methods of presenting study guide materials are being investigated.

VII. Requirements for full effectiveness at each stage of the training film process must be maintained throughout. Each link must be strong, from the conceiving of the film objectives to the point of presentation of the film to the students. A perfect film that is ruined at the time of presentation by such items as poor seating arrangements, inadequately controlled lighting, poor ventilation, bad acoustics, faulty projection, etc., can reduce greatly the amount of learning. At all times optimum conditions should exist in order to obtain the best results possible.

CHAPTER VI

TELEVISION

Background

Hungerford relates that in 1929, while a freshman at the Massachusetts Institute of Technology, he, with his contemporaries, spent hours attempting to "tune-in" television images from a nearby television station that appeared, reddish in hue, on his three inch screen.[1] Television, at that time, and for many years later, appeared to be "just around the corner," but perfections had to take place before it became a reality. Dr. Zworykin of RCA invented the iconoscope, and Dr. Farnsworth the image dissector; these were followed by the cathode ray tube, patterned after the Braun tube earlier produced in Europe.[2]

In 1936, all the above were gathered into a system to make possible the projection of electronic pictures through the air. On July 7, 1936 the first live-talent electronic television broadcast in the United States took place.[3]

Before World War II the National Broadcasting Company was conducting a full fledged schedule of television programs.

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1. E. A. Hungerford, Jr., "The Use of Television in Education," p. 1, A Report, Special Devices Center, Port Washington, L.I., N.Y. Aug. 5, 1949.

2. Loc. cit.

3. Loc. cit.

For educational programs, such renditions as 'The Explorers' Club,' and 'Thrills and Chills with Doug Allen were produced.[1] Biology was taught, and the Metropolitan Museum of Art employed the facilities of television for its programs. Chemistry was taught in one instance to an actual class at New York University.[2] Just prior to the United States' entry into the war, instruction was given Air Raid Wardens in the performance of such duties as Air Raid Instruction, First Aid, and De-contamination.[3]

The Navy, through its Office of Naval Research, has subsequent to the war become vitally interested in the medium of television for the development of its instruction programs--this interest has spread to other branches of the Armed Forces.

> In the Navy we call it instruction, but instruction and training or education are not far removed. To instruct is to show someone how to do a task. To educate him is to also show the theory behind your instruction. In wartime, the services have little time for the latter unless it contributes to the speed and effectiveness of instruction to a marked degree.[4]

Hungerford states that the Armed Forces have definite reasons for being interested in television for their instruction programs; these are:[5]

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1. Ibid., p. 5.
2. Ibid., p. 6.
3. Loc. cit.
4. Ibid., p. 8.
5. Ibid., pp. 8-10.

I. The services are interested in speed of training and, therefore, seek a medium such as television which has a great impact upon the learners. Television is up to date, alive, and gives an immediacy to the training well received by the students.

II. The television medium is flexible. If only a few are viewing the television screen, or if there are thousands viewing screens, no second print is needed --the one program can be confined locally or viewed by a widely scattered populace.

III. Television gives standardization. The same "word" is received by all the students. In the handling of life and death mechanisms, standardization of instruction is of vital importance.

IV. The effectiveness of one able instructor is multiplied many times by the use of television. There are insufficient top-grade instructors. In the military forces where good instructors are retained to train new instructors, and where the best of the new are also retained to provide instructor training, it leaves only the lowest caliber instructors doing the actual instructing of students.

Disadvantages of television, as cited by Hungerford are:[1]

I. Television cannot act alone--it must act as an adjunct to other methods of teaching. Instructors

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1. Ibid., pp. 10-13.

to "follow up" on television programs and aid in the motivation of students toward further learning are considered necessary.

II. The distribution system for television as now devised does not allow for proper security of classified subjects. Coaxial cables and secure microwave links would circumvent these disadvantages, however.

III. Instruction by television in its initial stages is expensive. The expense of original plant investment later, of course, becomes infinitesimally small providing the training audience is large enough.

IV. The television instructor must be of outstanding caliber--his sole audience is the camera lens. He must be able to recognize the more complicated portions of his lecture and take time to explain them in great detail. This point has been taken into consideration by the Navy in its recent projects so that the instructor has been able to check up on his audience reaction, and the system allows for audience participation which, in itself, has proven educational benefits. In those cases where the instruction is reaching more than ten classrooms, a voice circuit is introduced which allows for communication between the instructor and the

students. For example, after having labored over a particularly difficult point the instructor may want to know how his point was received so he simply might address a question to seat seven in Boston, there being a seat seven in every classroom. Or he merely may address a question to the audience in New York or Washington. When the classrooms number in the hundreds, little dial buttons are on each student's desk allowing him four choices in a multiple choice quiz and the students "dial in" the answer they feel most suitable. The instructor then reads a simple device in his studio that quickly indicates to him the percentage of correct answers. This allows the instructor to deviate from his prepared script as necessary in order to assure proper assimilation of a given point.

V. Since television is a live medium, unlike the movies that can be retaken, mistakes appear in various form during the performance. Students, however, realize this feature and this disadvantage actually gives television an impact of its own so that they are drawn closer to the instructor since they realize "to err is human."

VI. The expert instructor at the television studio must depend upon local instructors for follow-up and further motivation of the students. This is

obviated, too, to an extent by having the studio lecturer discuss his lecture informally with local instructors over the circuit prior to the presentation of the instructional program.

Navy Experiments in Television

The Special Devices Center, a field activity of the Office of Naval Research, has been conducting experiments on the use of television at Port Washington, Long Island, New York.

> The studio is a well equipped facility. In a sound and airconditioned room 40 feet by 50 feet by 18 feet high are two image-orthicon live camera chains mounted on a moving picture type dolly. There are adequate quantities of lights, microphones, and miscellaneous equipment. A film chain is also available, arranged such that either motion pictures (16mm) or one or two slide projectors can operate into the iconoscope film camera using a setup of mirrors. The projectors can be loop dissolved, one to the other or to the live cameras, through a very flexible control console. Two portable image-orthicon camera chains are also provided for operating remotely from the studio. These same cameras are also used in the studio when three or four cameras are needed. They are then connected through the master console for complete flexibility. For point to point relaying we also have constructed a UHF link transmitter for video and have adapted a low powered FM transmitter for sound transmission.[1]

During the first six months of 1949, Naval Ordnance and Gunnery were taught to the Kings Point Merchant Marine Academy about five miles distant. Forty telecasts were run in all, with twelve used for controlled evaluation. In eight

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1. Ibid., p. 14.

of these twelve controlled lectures, five were on radar and three on battery alignment. The instructor taught two, twenty man sections via television and three face to face. The same instructor was used in each instance in order to eliminate instructor differential. In the other four lectures, on CIC and sonar, the best instructors in television available were used in that medium, while in the face to face lectures the run of the mill training instructors normally found at a training station were used. Visual-aids in the television broadcasts were kept to a minimum. Dr. Robert T. Rock of Fordham University evaluated the experiments.[1]

> We came out even all in all. At the present state of our advancement, we could teach as well over the system and get as much across as could the same instructor working with a class head on, and using all the same props which he had designed for television. I always thought that this was somewhat unfair to us, since no local instructor could have the props we used for operation on a grand scale, because only one set for the television studio could be afforded. This is one of our advantages. So maybe we did pretty well to come out even. I hasten to add my own opinion, which has many backers, that at present we exploit the television medium about 40% of what we could do. So the handwriting on the wall is clear. We will excel face to face teaching and simultaneously we will teach all alike per se. We have a future.[2]

In substantiation of Hungerford's remarks a consultant to the Human Resources Research Laboratories who sat as

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1. D. D. Reynolds, "Training by Television," pp. 5-6, A Report, Special Devices Center, Port Washington, L.I., N.Y. September, 1949.

2. Hungerford, op. cit., p. 18.

an observer during some of the evaluations had this to say:

> While these findings will probably be favorable, they cannot give a full picture of television's usefulness in training. The construction of the tests, the conditions under which they were administered, and the nature of the programs, themselves, make this unlikely. The general indications are that television can probably make a much greater contribution to training than this study will show.[1]

Later in 1949 a series of lectures was beamed via television to Naval Reserve groups at three Naval Air Stations: Floyd Bennett near New York City; Willow Grove near Philadelphia; and Anacostia near Washington, D. C. Some were for officer students and others for enlisted students. A breakdown of the curriculum appeared as follows:[2]

Officer Pilots	Enlisted Airmen
Civil air regulations.	Theory of flight.
Aerology; air masses and fronts, including cyclonic depressions.	Line safety, aircraft landing, and pre-flight.
Aerology; weather map analysis, including frontal weather, thunderstorms, etc.	Plane captain duties; servicing radar and interphone; cleaning instruments.

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1. S. F. Harby, "Report on the Television Project Conducted by the Navy At Its Special Devices Center, Port Washington, N.Y. (June 30 to Sept. 18, 1949), p. 15, A Report, Audio-Visual Research Division, Human Resources Research Laboratories.

2. Reynolds, op. cit., p. 8.

Navigation; flight problems, including use of computers.	Ordnance and aerial gunnery.
Radio aids to navigation including an introduction to ground control approach.	Weights and balances.
Use of oxygen at high altitudes.	Survival and safety.
Engineering; pre-flight check, weights and balances, yellow sheet.	Basic jet engines.
Planning the flight under marginal weather conditions; cross country flight under visual flight rules, and instrument flight rules; instrument landing system; ground control approach landing.	Basic nuclear physics.

As concerns the difference in techniques employed in instructing officers as compared to enlisted personnel in the above curriculum, some interesting observations were made by Harby.[1]

> In my own opinion, the programs for enlisted men were much more effective than for the officer group. The fact that the enlisted men had little previous training influenced the program makers to build simple, practical lesson plans, with heavy dependence on demonstrations, models, films, and other visual aids well-suited for televising. The officer's programs were more theoretical and depended more upon language. We mention this here only as an example of how the character of the audience will influence the programs to be televised. As for the audience density, structure, viewing habits, and conditions, these matters are easily determined by directive in a military organization.

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1. Harby, op. cit., p. 5.

Some Production Problems and Techniques in Television

When instructional programs are to be used on a national scale, where a difference in time zones would bring about differentials in the time of day in which various audiences would view the program, the problem of audience motivation is involved. It has been pointed out that the very first morning classes are "slow," that classes before lunch are "flighty"--thinking of lunch, that classes immediately after lunch are "drowsy" and apathetic.[1] Some thought should be given to proper curriculum timing throughout the day in instances such as these for maximum utilization of television schedules.

Some opinions have been expressed that, like movies, television programs are so vitally packed with factual information that it is difficult for the student to assimilate all of a lengthy training production. It has been suggested that mental "rest periods" be introduced--equivalent to the period when the class looks out the window--during which mental relaxation is allowed without losing the thread of the entire program. It has been further suggested that "ten minutes is the maximum for one subject, and three minutes the maximum for one technical point. Then a break and a fresh start."[2]

A question has arisen as to whether or not classes should be separated on the basis of high or low I.Q.'s. An answer

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1. Reynolds, op. cit., p. 15.

2. Ibid., p. 15.

to this problem has been suggested in that the purpose of the program should first be ascertained. If the aim is to impart a maximum amount of information in the shortest amount of time then division by I.Q.'s is reasonable. If the program were, however, to serve as a selective function where the more able were to be selected for further training and the less efficient weeded out, then no such division would be useful.[1]

Problems of finding the right instructor have appeared --the problems of the instructor himself have been discussed previously;[2] however, it should be noted that when the Special Devices Center, after having designated certain elementary criteria for their desired instructor, used IBM procedures to select them from available Naval officers, only one was found to fill the billet. It must be remembered that highly capable officers or highly capable technicians do not guarantee highly capable television instructors. Professional actors have been used by the armed forces in wartime movies--in some cases this policy has points in its favor. "A professional actor used in the Kings Point series, however, brought comments from the class that he didn't sound as if he knew what he was talking about."[3]

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1. Loc. cit.
2. Supra, pp. 61-2.
3. Reynolds, op. cit., p. 17.

The amount of props and visual-aids to be utilized in a television program cause concern especially when large props, such as cut-away model jet-engines, are desired to be utilized. Rather than going through the exorbitant expense and time involved in bringing the model to the television studio, it is suggested that short movie sequences be made of the model and the instructor, to be projected via television when necessary, so that the expense and time involved in moving the prop be eliminated.

Television in Civilian Education

Civilian educators are frequently thought of as being slow to adopt new methods. Who, however, would advocate using untried methods before putting them to general use in our educational institutions? It is thought, however, that with the possibilities of television being as great as they are, educators should not imperil their positions by not taking part in its development. Some of the things that educators might do in this particular field have been suggested by Lewis as being:[1]

I. Programs should be planned in cooperation with local television producers. At present, much scheduling time is still available, and since stations are "public service" minded, educators could schedule

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1. Philip Lewis, "The Future of Television in Education, The Phi Delta Kappan, Vol. 30, (Dec., 1948), pp. 157-8.

local programs of educational interest especially during school hours.

II. Setting up "on the job" training programs with local producers to train key personnel who could "carry the word" to others.

III. Develop program techniques that avoid an amateurish presentation which cause resentment in the viewers.

IV. Conduct experiments to determine in which fields the medium of television is best suited.

V. Set up controlled experiments to discover the retentivity of subjects taught via television.

VI. Determine the effects of such causative factors as eye fatigue, viewing angles with direct view vs. projection receivers, contrast and brilliancy, and attention spans of various age groups.

VII. Advocate and support the establishment of a national commission on the educational aspects of television, the objectives of this group to be aimed at setting up standards, specifications and goals for school use, and to distribute information to the profession concerning the sociological, psychological, technical, managerial, and artistic characteristics of the medium.

VIII. Display such interest in the use of television for educational purposes to influence the Federal Communications Commission to set aside certain channels

exclusively for education purposes. This should be done before regular commercial agencies secure all the available channels for strictly entertainment purposes.

IX. Assemble and publish all the material in this field periodically in order to keep the profession informed.

Lewis cites the following as important steps that already have taken place in television of which educators should take note:[1]

I. Television has been used for mass testing purposes and in the future it is believed standardized tests can be given through this medium.

II. The research and projects developed by the Navy at its Sands Point, Long Island center should be noted.

III. The medical profession is using television for instructing its members through the use of coaxial cables connecting viewing screens to the operating rooms.

IV. Magnification of objects through the use of the microscope has been successfully used in television broadcasts.

V. Aircraft with proper equipment have relayed televised pictures back to their home stations for filming and making into topographical charts.

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1. Ibid., pp. 158-9.

VI. By placing television cameras on remote mountain peaks and relaying pictures back to classrooms, astronomical study has been possible.

VII. Television kits for assemblying purposes come complete now with instructions so that their technical aspects of construction can easily be taught in the classroom.

VIII. Some public high school workshops already are set up training both teachers and students in television procedures. Graduates of the workshops are being employed immediately by the industry.

IX. Retentivity is very high in television programs, according to early experiments.

X. When necessary permission is received, still pictures or movies can be recorded from monitor scopes so that an up-to-date library can be maintained in such manner on pertinent subjects.

XI. A "community school," where school auditoriums are thrown open to the public for viewing special interest television programs bear public approval.

XII. Educational institutions should plan now on proper, reliable, inexpensive equipment with an eye to the future in television.

XIII. Educational institutions should consider setting up their own mobile television transmitting stations in trailers, for example, that allow for a multitude of locations thus giving added scope to the programs.

XIV. Television is not expected to replace the teacher, but will be a valuable assistant.

XV. Television is an entity all its own, but it will not replace present day radio. A merger will probably take place where FM (frequency modulation) will probably take the place of AM (amplitude modulation). FM will probably furnish the sound for television broadcasts and will carry on by itself as an audio medium during those hours when listeners cannot take time off to watch the screen.

XVI. Children are most effective on television when just being themselves.

XVII. Human beings, being natural imitators, accept as a challenge any new method they see of doing something, and television would provide the means for making this challenge possible.

XVIII. Television is so flexible a medium that it can go far beyond the possibilities of the stage and the movies.

Innovations that have taken place within the television industry are listed by Lewis as worthy of note to civilian educators:[1]

> 1. The United Nations Headquarters in New York have been planned to include television to link their principal offices so that officials may view screens to see as well as hear what is going on in the major council chambers.

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1. Ibid., pp. 159-60.

2. Several large department stores in some of our principal cities tested (very successfully) a shopping service, whereby customers are seated comfortably before a screen which reveals the happenings in each of the departments as the television camera makes the rounds.

3. Specially built equipment permits remote observation of dangerous, inaccessible, and critical processes or experiments (inside oil wells, steel mill processes, atomic explosions, etc.). This device delivers a continuous image of a specific process to a screen located in an observation room in a desirable place. Actually, a single person can supervise many different situations by means of a multiple screen installation.

4. During World War II, two general types of airborne television were developed. Block equipment was designed for unattended operation. "Ring" apparatus requires the attention of an operator. Both systems have potentialities which are far from realization at this time. Imagine a helicopter fitted with either type of television hovering near the scene of a celebration, disaster, important happening, process or operation, and reporting" to the viewing audience as the event occurs. Robot or radio controlled craft can be so fitted to assist in exploring the upper regions of the "bottomless" holes in the sea.

5. Ultrafax, a new system of communication which combines television and facsimile, may be used for transmitting printed matter, maps, messages, letters, drawings, and any other form of visual material. The contents of a 500 page book can be sent coast to coast in one half minute. The Sunday metropolitan paper including the comics, can be transmitted over the same route in just one minute! A single television circuit can carry the equivalent of 40 tons of airmail cross country in a day. It is quite possible that some day Ultrafax will replace the mails as we know it, since it's just a further development of V-mail, but the images on the micro-film are transmitted and received by television and re-recorded on other micro-film.

6. Underwater television experiments conducted by the Navy opens a new field in deep water investigation and another in novel programs. Fishermen may use this device to locate schools of fish and oyster beds. Explorers will be enabled to scan the ocean bottom, and even submarines may be fitted with television "eyes."

7. Pleasure boats, commercial aircraft, and taxicabs have been equipped with the new medium as a service for their passengers.

8. It has been proposed that tourist agencies in vacation spots show their prospects the highlights of a proposed junket by means of images sent from an airplane flying over the area. This same method can be used for police traffic control of arterial highways in congested areas.

Some speculative experiments still in the laboratory stages should be reviewed also for the stimulus they may provide at some possible future date:[1]

I. International television is a definite possibility now.

II. Electronic color television has been demonstrated and it is predicted it will be in commercial usage within the next few years.

III. Three dimensional images have been demonstrated and, although the equipment is too cumbersome at present the possibility exists of a third dimension being added to television pictures of the future.

IV. Infra-red image tubes have been demonstrated successfully. In the future, television pictures may be taken without the benefit of artificial light for illumination purposes.

It behooves all affiliated with training and educational processes to give television the utmost consideration.

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1. Ibid., p. 160.

Finstad has said:[1]

> The future holds even brighter prospects for the forward-looking. Visualize overcoming technical difficulties and costs to the extent that teaching demonstrations could be transmitted to and relayed to ships wherever they might be; fancy personalizing the demonstrations through talk-back loops permitting coordinated questions and answers on the spot; imagine scrambling and unscrambling the transmissions to assure security of classified information! Truly, it is difficult to remain reservedly philosophical about the prospects of this medium.

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1. Allan Finstad, "The Navy Looks Forward in Audio-Visual Education," U.S. Naval Training Bulletin, November 1948, pp. 22-3.

CHAPTER VII

RECOMMENDATIONS

The subject material of this study has been of such a broad nature that it, as a whole, has been treated and compiled as a summary of research in its subject field. Chapter sub-divisions have been so compiled as to treat their specific areas in summary form.

The recommendations suggested below are presented as being applicable to the United States Navy so that its high standards of training are consistently maintained in the present and in the future as concerns training through the medium of motion pictures. It is felt the Navy should:

I. Continue always, during peacetime, the present Instructor Training Schools at Norfolk, Virginia and San Diego, California in order to build a nucleus of well-informed instructors, familiar with Navy methods, for a framework upon which to build a rapid expansion of trained instructors during emergency periods.

II. Place adequate emphasis on the curricula of the afore-mentioned schools on the proper utilization of audio-visual aids, but especially on the educational and psychological principles involved in movie and television aids.

III. Arrange the curricula in the afore-mentioned schools to allow training in the field of instruction through television when present research of the Special Devices Center and other institutions give the proper criteria upon which to base such a curriculum.

IV. Give adequate in-service publicity to the advantages of motion pictures in a training program, through the devices of the movies and television, as learned by Pennsylvania State College and the Special Devices Center.

V. Implement, as practicable, those theoretical principles of movies learned at Pennsylvania State College to the television research, problems, and programs of the Special Devices Center.

VI. Make procedures of maximum cooperation feasible, as concerns facilities and programming, between the Navy's Photographic Center at Anacostia and the television studios of the Special Devices Center, in order that the two establishments may realize full utility of each other's resources toward the end of greatest utility and economy.

VII. Inform, through and with the cooperation of the National Military Establishment, the Federal Communications Commission regarding the network of coaxial cables (which will give security to

classified instruction) that will be necessary for the Navy's use in wartime training. It must be borne in mind that the civilian populace itself will probably have a great need for television coaxial cables for instruction and morale purposes during such periods.

VIII. Install television receivers for training and other purposes in both shore stations and ships as soon as technical difficulties have been surmounted.

IX. Cooperate with civilian educational institutions toward the further development of motion pictures, both through movies and television.

X. Consider the establishment of mobile television transmitting units, complete in equipment and personnel, that could move from place to place giving a maximum utilization of the far flung television subject material of the Navy. One such unit, even, in peacetime, for experimental purposes, should be highly successful for public-information purposes, such as "home-town-news" and recruiting.

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